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DIS Seismic Isolater

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EMERGING CONSTRUCTION TECHNOLOGIES

Civil - Construction Equipment & Methods

DIS SEISMIC ISOLATER

THE NEED

As an earthquake protection technology to the specific needs and requirements for flexible structures, energy dissipation products are installed in the structural frame and wall and will reduce interstory drift cause by earthquakes. Dampers are introduced into structures in order to absorb much of the kinetic energy created by wind, mild tremors as well as major seismic events.

THE TECHNOLOGY

Seismic isolation bearings isolate a structure from the ground motion produced by an earthquake. The energy absorption devices are designed to absorb the energy associated with an earthquake. This seismic (Base) Isolator consists of alternate layers of rubber and steel bonded together, with a cylinder of pure lead tightly inserted through a hole in the middle. The rubber layers allow the isolator to easily displace sideways, reducing the earthquake loads felt by the building and its occupants. They also act as a spring, ensuring that the structure returns to its original position after the shaking has stopped.

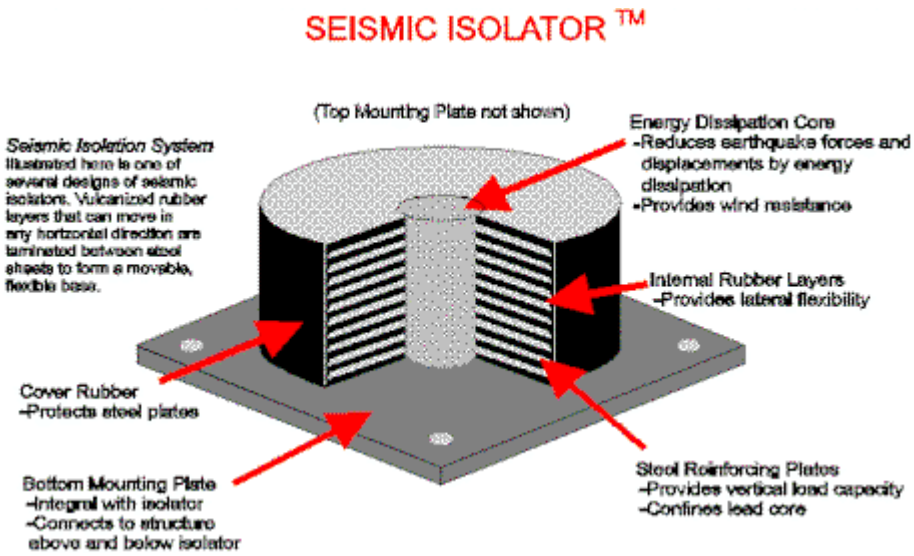

FIGURE 1 FEATURES OF DIS SEISMIC ISOLATER

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By bonding the rubber to thin layers of steel, the isolator becomes much stiffer under vertical loads so that the structure will not move up and down during day-to-day use.

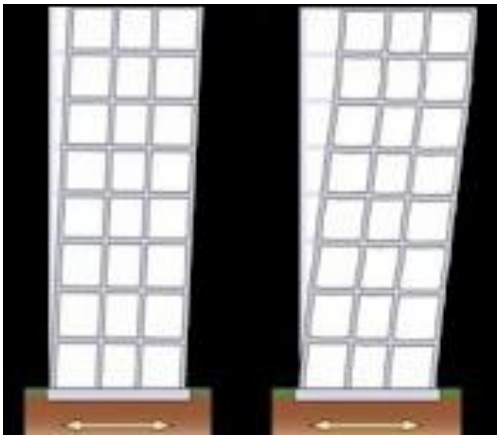

FIGURE 2 ENERGY DISSIPATION (LEFT) VS. WITHOUT ENERGY DISSIPATION (RIGHT)

Thick steel plates are bonded to the top and bottom surfaces to allow the isolator to be solidly bolted to the structure above and to the foundation below. The isolator lead core stops the structure from moving sideways under wind and other non-seismic loads. During earthquake events, the lead is pushed sideways by the rubber and steel layers absorbing a portion of the earthquake energy. This dampening affect helps to further reduce the earthquake forces and help control the lateral displacement of the structure.

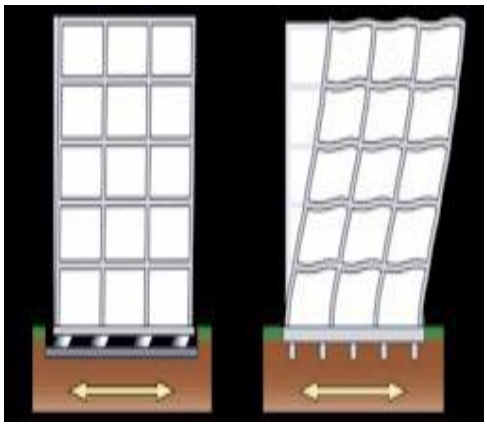

FIGURE 3 SEISMIC ISOLATION (LEFT) VS. WITHOUT SEISMIC ISOLATION (RIGHT)

THE BENEFITS

Pioneered by DIS Inc., seismic (base) isolation reduces ground motions transmitted into structures. By isolating the effect of earthquakes through state-of-the-art "shock absorbers", this technology can reduce the effects of seismic forces up to eight times over, helping to not only ensure the survival of the structure, but its ability to function afterwards without interruption to business.

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STATUS

There are now 400 structures by seismic isolation in 17 countries. 115 are in U.S. In new six story building at the Martin Luther King/Drew Medical center in Los Angeles, California, DIS fabricated the largest High Damping Rubber (HDR) isolators used to date, in U.S. At 40" in diameter and 20" high, each unit weighs nearly two tons with attachment plates. Seventy isolators make this one of the largest installed systems in U.S.

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REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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